

KENWOOD

4-CHANNEL POWER AMPLIFIER

# KAC-943

## INSTRUCTION MANUAL

KENWOOD CORPORATION

**Take the time to read through this instruction manual. Familiarity with installation and operation procedures will help you obtain the best performance from your new 4-channel power amplifier.**

### **For your records**

Record the serial number, found on the back of the unit in the spaces designated on the warranty card, and in the space provided below. Refer to the model and serial numbers whenever you call upon your KENWOOD dealer for information or service on the product.

Model KAC-943      Serial number \_\_\_\_\_

# SAFETY PRECAUTIONS

## **▲ WARNING**

**To Prevent fires and avoid personal injury in case of accidents.**

- When extending the Power supply, or Ground lead, avoid short circuits by using 5 mm<sup>2</sup> (AWG5) or larger automotive grade cable.
- Check to be sure that no metal objects (tools, needles, coins) are left inside the unit.
- If you smell or see smoke, disconnect the unit immediately and consult your KENWOOD dealer. Continued use can cause a fire or permanent damage to the unit.
- Do not touch the unit during use because the surface of the unit becomes hot and may cause burns if touched.

## **▲ CAUTION**

**To keep the unit in proper working order.**

- Be sure it's connected to a 12V DC power supply with a minus ground connection.
- Do not open front panel or top bottom cover.
- Do not exposed this unit to direct sunlight or high heat.
- Keep it clean and dry.
- Be sure it is fastened securely and not exposed to excess vibration.

## **NOTE**

- If you have difficulty in installing this unit in your vehicle, please contact your KENWOOD dealer.

## **Cleaning**

1. Always turn the power OFF before cleaning.
2. Wipe the front panel and other exterior surfaces with a soft dry cloth or a soft cloth lightly moistened with a neutral detergent.

## **▲ CAUTION**


- DO NOT use abrasive pads or paint thinner, benzene, or other volatile solvents. These may remove the indicator characters.

## **FCC WARNING**

This equipment generates and uses radio frequency energy. Changes or modifications other than those expressly approved in the instruction manual may cause interference with radio and television reception.

Unauthorized changes may lead to the user's loss of the authority to operate this equipment.

# ACCESSORY

| Part name                                       | External View                                                                      | Number of Items |
|-------------------------------------------------|------------------------------------------------------------------------------------|-----------------|
| <b>Self-tapping screw</b><br>( $\phi$ 5 × 18mm) |  | 4               |

## INSTALLATION PROCEDURE

1. Before starting installation, disconnect the  $\ominus$  terminal of the battery.  
This will prevent short circuits.
2. Connect the Input and Output leads. (☞ P.8~9)
3. Connect the Ground cord to the metal body of the car. (☞ P.9)
4. Connect the Power cord. (☞ P.9)
5. Install the unit in the car. (☞ P.16)
6. Connect the negative  $\ominus$  terminal of the battery.

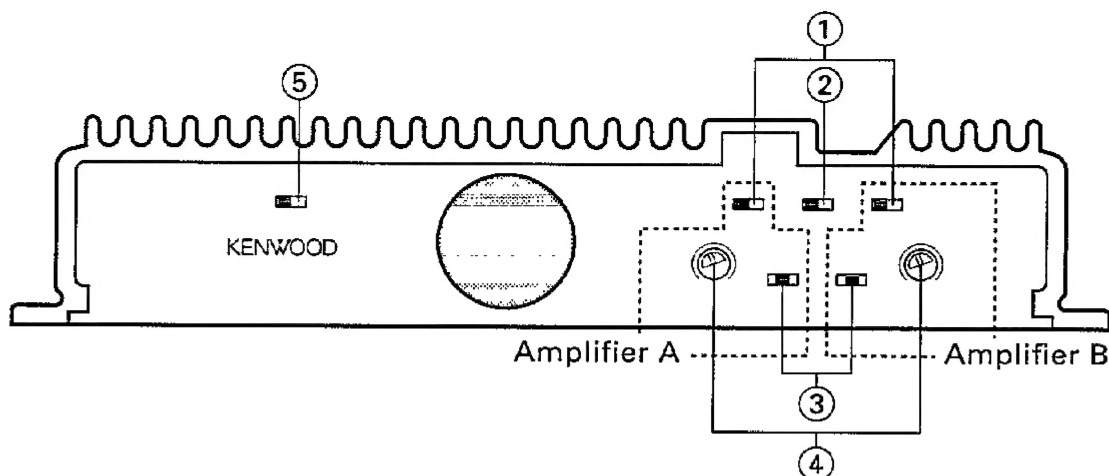
### **▲ CAUTION**

- A short circuit may cause a blown fuse. A short circuit is a serious problem that could also cause a fire. Check the wiring carefully and, if any wires are short-circuited, rewire immediately. If no short-circuits are found, replace the fuse with one having the same rating (see indication on unit).
- Check that no unconnected wires or connectors are in contact with the body of the car. Extraneous noise or current entering the system can cause malfunction or damage.

# CONTROLS

## ■ KAC-943

This is a 4-channel amplifier including 2 stereo amplifiers in a body. One amplifier is referred to as amplifier A and the other is amplifier B. This unit is compatible with a large variety of systems by combining the switches and functions described in the following.



### ① Operation switch

This switch allows to select the amplification method of input signals.



#### ● STEREO position:

The input left and right signals are amplified separately. Use this position when the unit is used as a stereo amplifier.

#### ● L + R position:

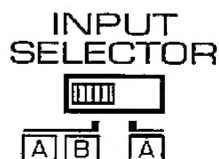
The input left and right signals are combined before being amplified. Use this position when the unit is used for subwoofer speakers or the L + R (monaural) sound is required.

#### ● MONO (L) position:

The input left signal is amplified twice the normal boost level. Use this position when the unit is used as a high-power monaural amplifier. (The input right signal is not output.)

### ② Input selector

This switch selects the input method of the signals to be amplified by amplifiers A and B.



#### ● [A] [B] position:

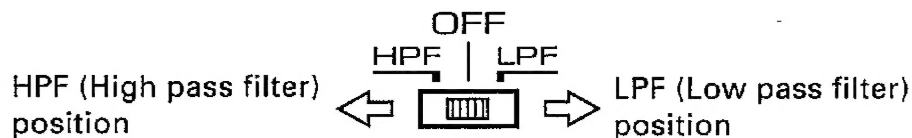
Amplifies both of the signals input to amplifiers A and B.

#### ● [A] position:

Amplifies only the signal input amplifier A with both amplifiers A and B.

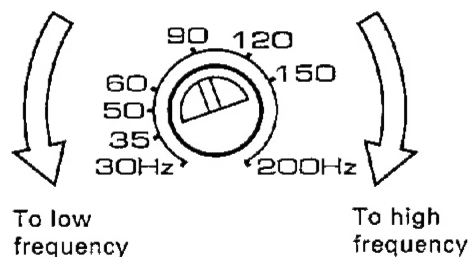
### ③ Filter switch

This switch allows to switch the filter function to High pass filter ON. Low pass filter ON or to OFF.



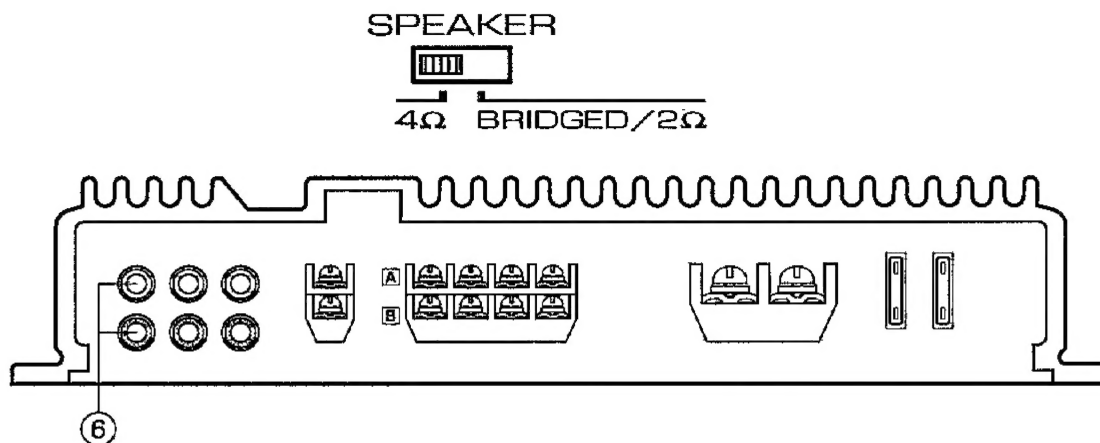
### ④ Filter frequency control (12 dB/oct.)

When the Filter switch ③ is in an ON position, this control allows to adjust the filter threshold frequency.



### ⑤ Speaker switch

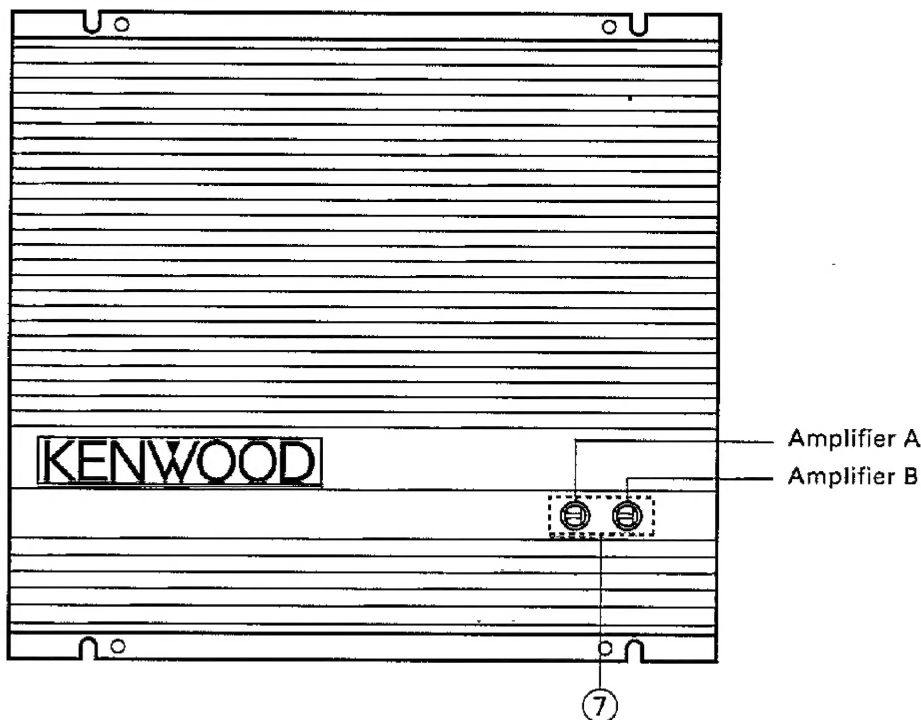
When the impedance of connected speaker is 4  $\Omega$ , set the switch to the left. When the impedance is 2  $\Omega$  or the output is bridge type, set the switch to the right.



### ⑥ Line output

These jacks output respectively the signals input to amplifiers A and B. They always output the stereo signals regardless of the position of the OPERATION switch.

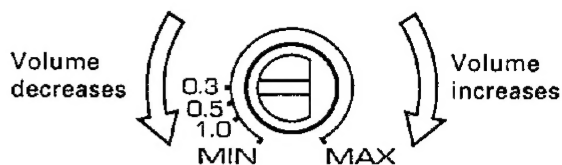
# CONTROLS



## ⑦ Input sensitivity control

Adjust the control according to the pre-out level of the center unit connected to this unit.

When the pre-out level of the center unit is between 800 and 1000 mV, set the input sensitivity control to the 0.3 V position.



| Center unit pre-out level | Amplifier input sensitivity |
|---------------------------|-----------------------------|
| 300 mV                    | MAX                         |
| 800~1000 mV               | 0.3 V                       |

## NOTE

Refer to "SPECIFICATIONS" on the center unit's instruction manual about the Pre-out level.

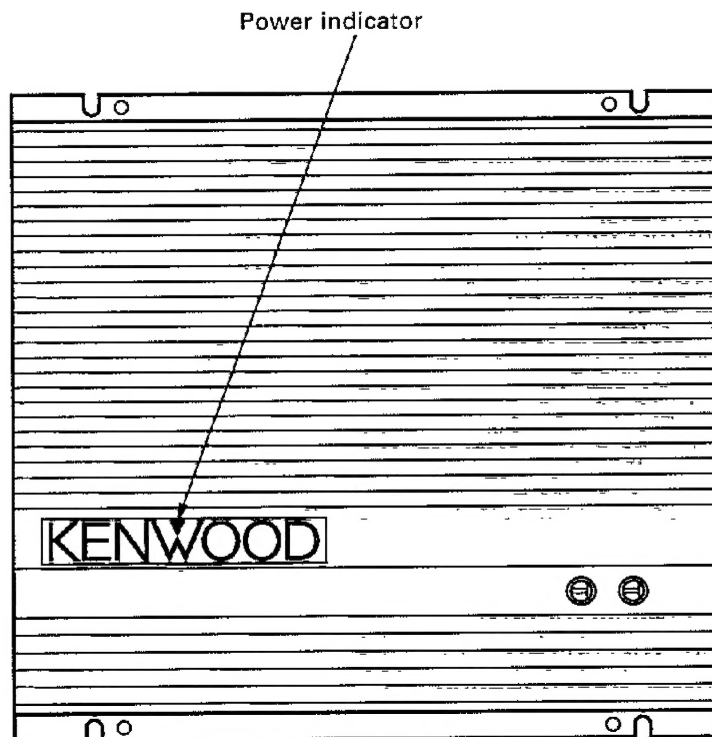
# PROTECTION FUNCTION

## Protection function

- This unit is equipped with a protection function for protecting this unit and your speakers from various accidents or problem that can occur.
- When the protection function activates, the unit stops operating and the power indicator lights green to indicate that the protection function is activated.

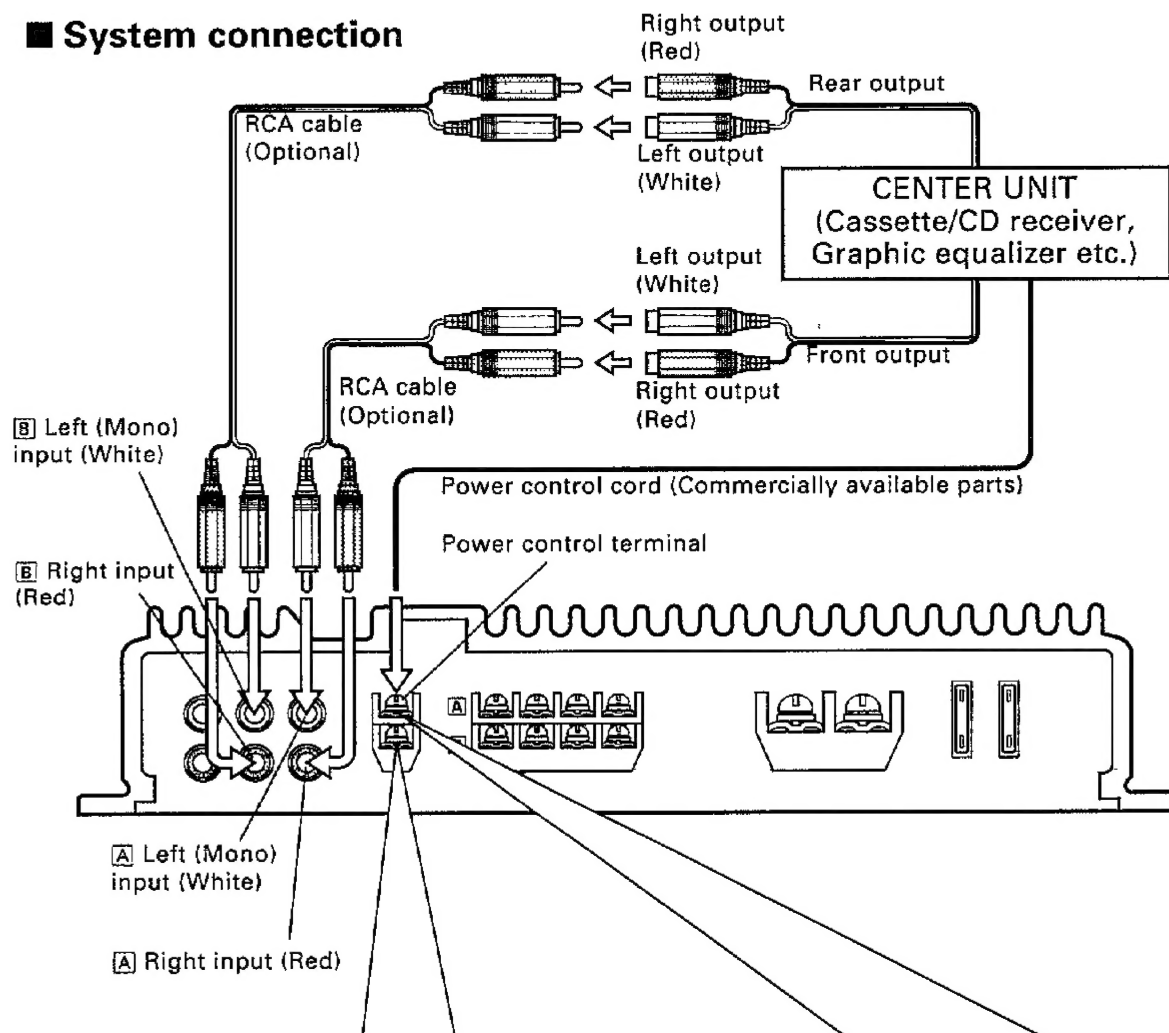
## The protection function activates in the following situations:

- When a speaker output contacts ground.
- When the unit malfunctions and a DC signal is sent to the speaker outputs.
- When the temperature of internal parts exceeds 120°C (248°F).  
[When the temperature exceeds 80°C (176°F), the cooling fan operate to cool the unit. However, if the temperature continues to rise regardless of the cooling fan operation, the protection function will activate to shut down the unit.]
- When the ground lead of the center unit (Cassette-receiver, CD receiver, etc.) or this unit is not connected to a metal part serving as an electrical ground passing electricity to the battery's minus ⊖ terminal.  
(In this case, the power indicator does not light.)



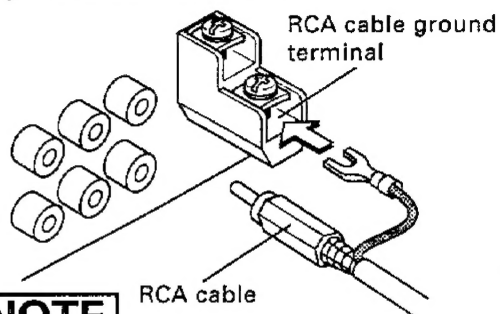
# CONNECTIONS

## ■ System connection



### RCA cable ground cord connection

- When using an RCA cable with a ground cord attached, connect the ground cord to this terminal.

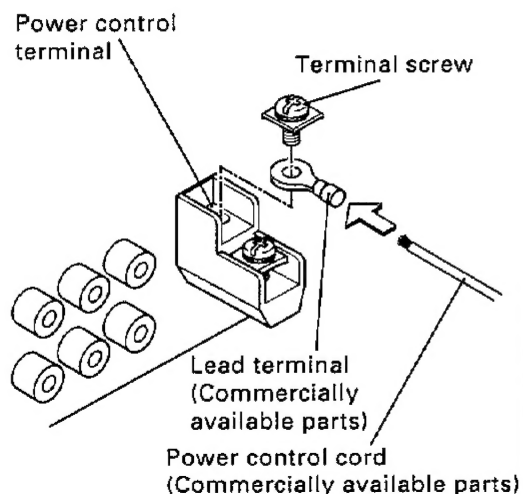


### NOTE

Do not use this terminal for power source grounding. This unit will not operate if the power source ground wire is connected to this terminal.

### Power control cord connection

- Connect the center unit's power control cord to this terminal.

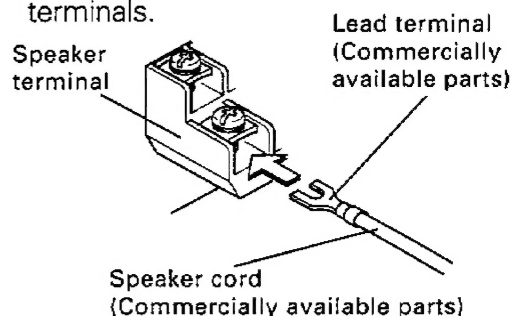




## ■ Power and Speakers cord connection

### Speaker cord connection

- Connect the speaker cords to these terminals.



A Front Right speaker

A Front Left speaker

| Operation switch  | Speaker terminal polarity |     |     |     |
|-------------------|---------------------------|-----|-----|-----|
| STEREO position   | L ⊕                       | L ⊖ | R ⊖ | R ⊕ |
|                   | L ⊕                       | L ⊖ | R ⊖ | R ⊕ |
| L + R position    | ⊕                         | ⊖   | ⊖   | ⊕   |
|                   | ⊕                         | ⊖   | ⊖   | ⊕   |
| MONO (L) position | ⊕                         | —   | ⊖   | —   |
|                   | ⊕                         | —   | ⊖   | —   |

B Rear Left speaker

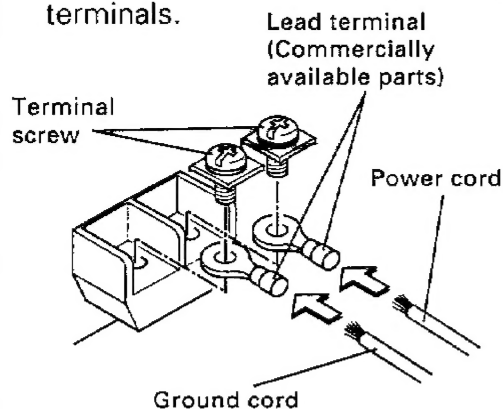
B Rear Right speaker

### NOTE

Connect the ground cord to a metal part of the car chassis that acts as an electrical ground passing electricity to the battery's minus ⊖ terminal.  
Do not turn the power ON if the ground cord is not connected.

### Power source connection

- Connect the power cord and ground cord to the corresponding terminals.



Ground terminal

Power terminal

Power cord (Commercially available parts)

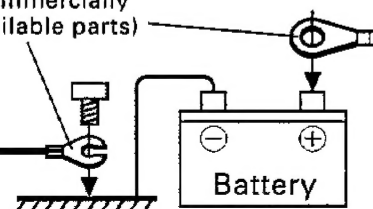
Ground cord (Commercially available parts)

- If a buzzing noise is heard from the speakers when the engine is running, attach a line noise filter (Optional) to the power cord.

### ⚠ WARNING

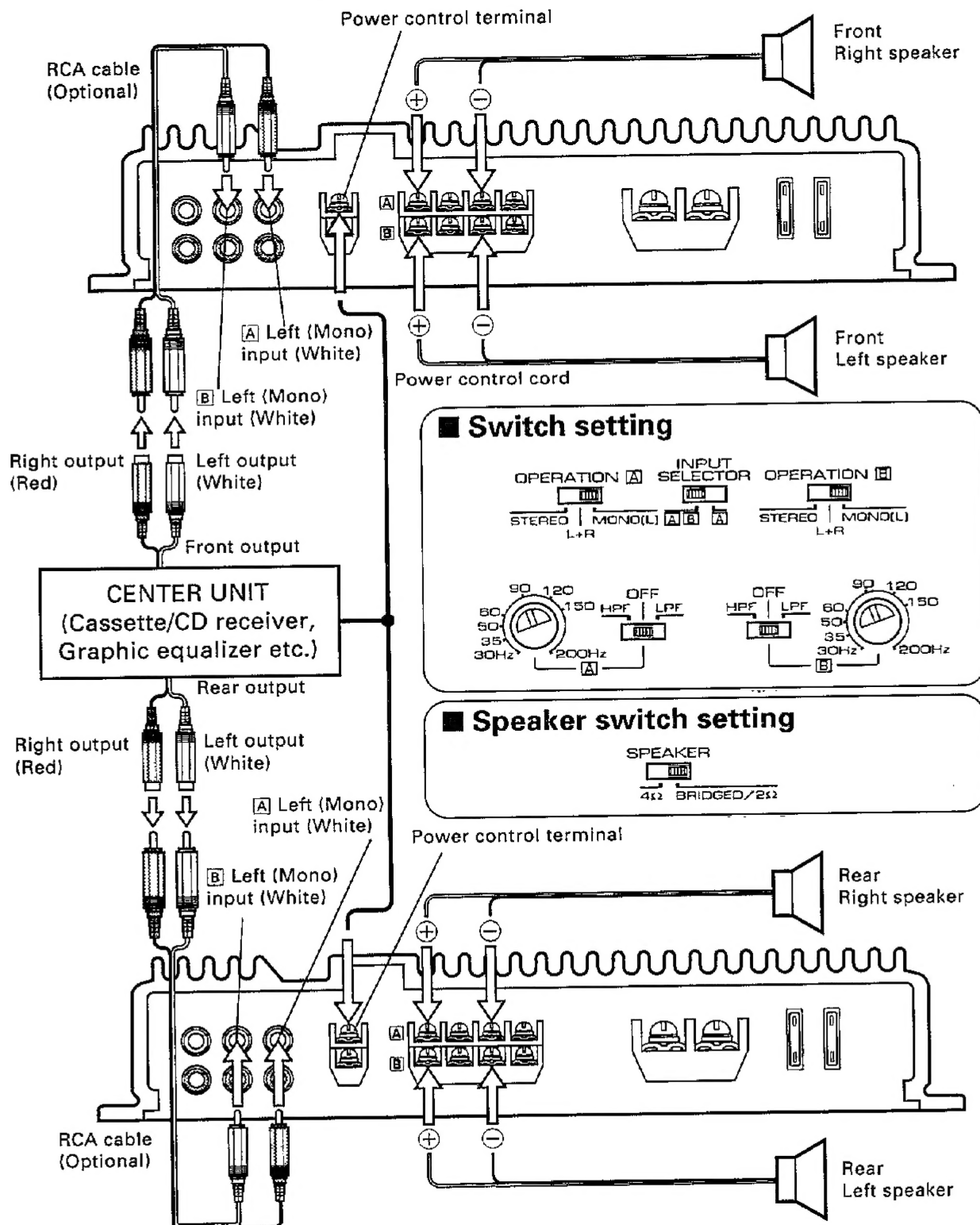
To prevent fire caused by a short in the wiring, connect a fusible link or breaker nearby the battery terminals.

Lead terminal (Commercially available parts)



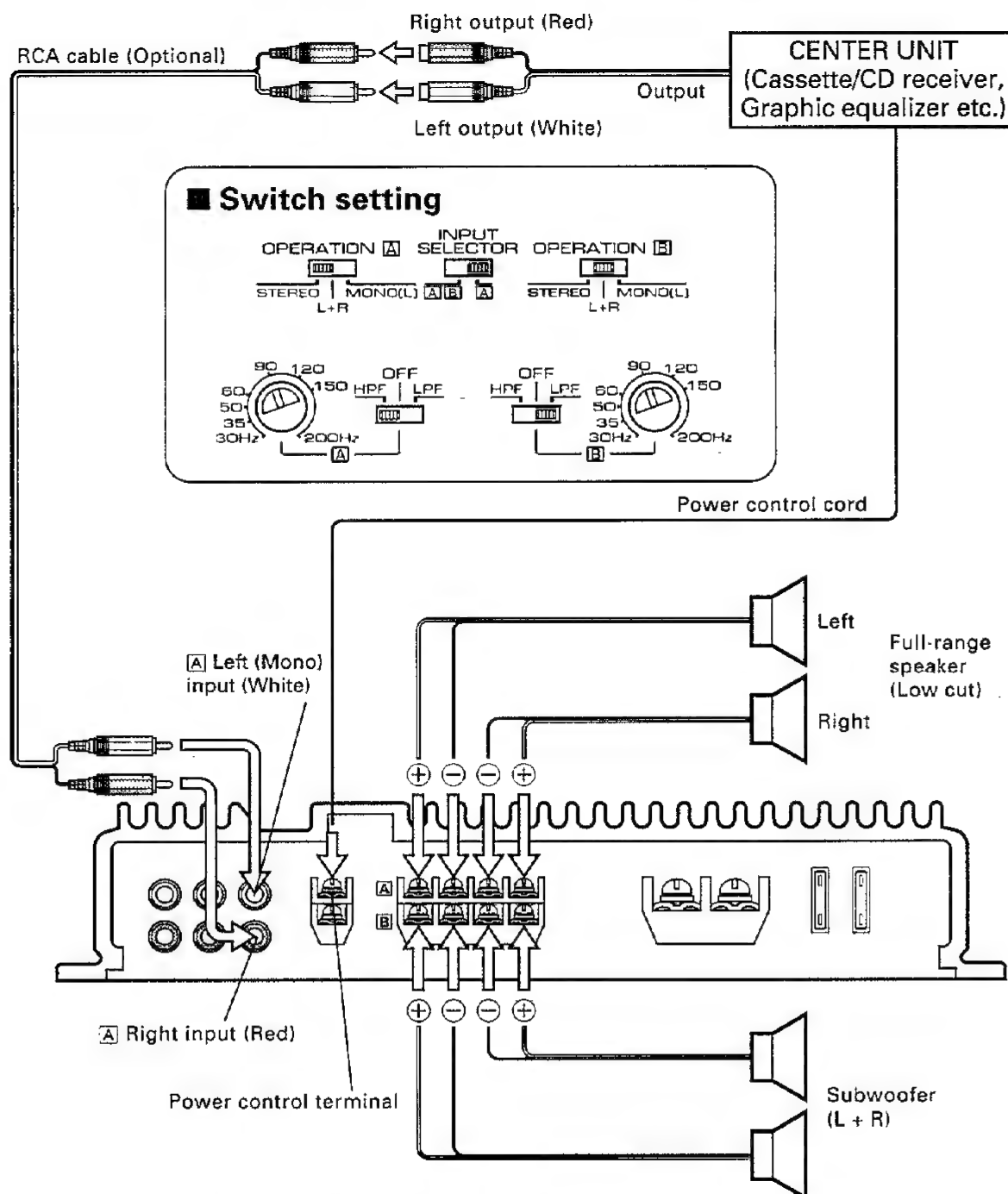
# SYSTEM EXAMPLES

**System example 1.** When two KAC-943 are used as 2-channel amplifiers, a high power 4-channel amplifier can be configured.



< Refer to P. 9 for details on power source wiring. >

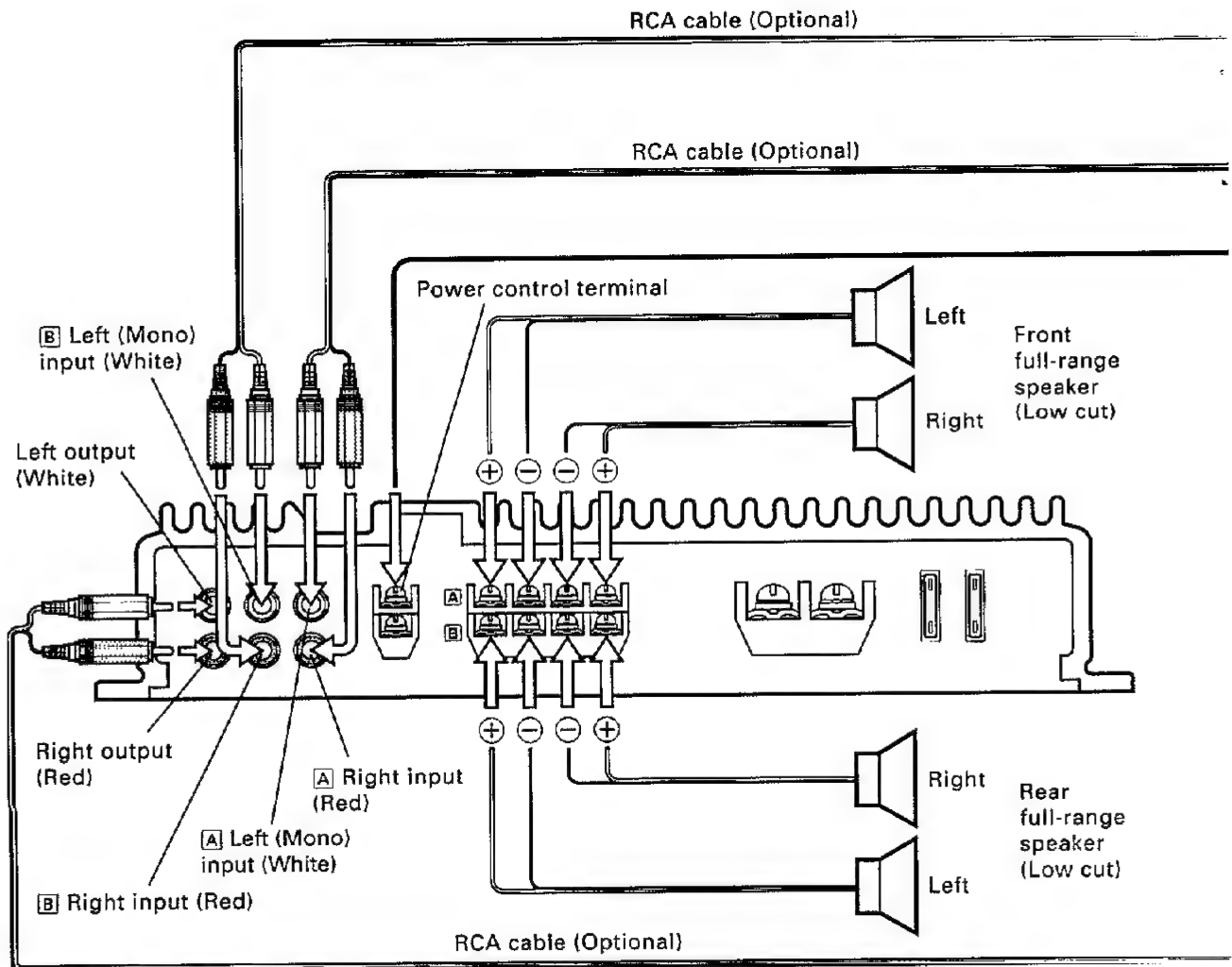
**System example 2.** A multi-amplifier system can be formed with a single unit. With amplifier A, use the high pass filter and connect full-range speakers to output 90 Hz or more from them. With amplifier B, use the low pass filter and connect subwoofers to output 90 Hz or less from them.



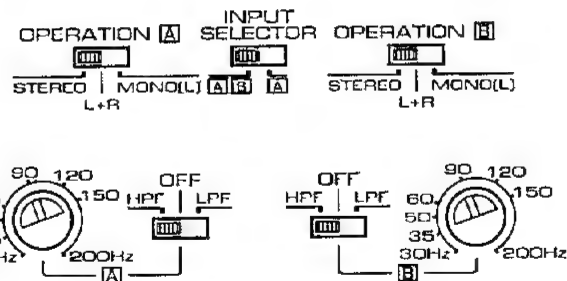
< Refer to P. 9 for details on power source wiring. >

# SYSTEM EXAMPLES

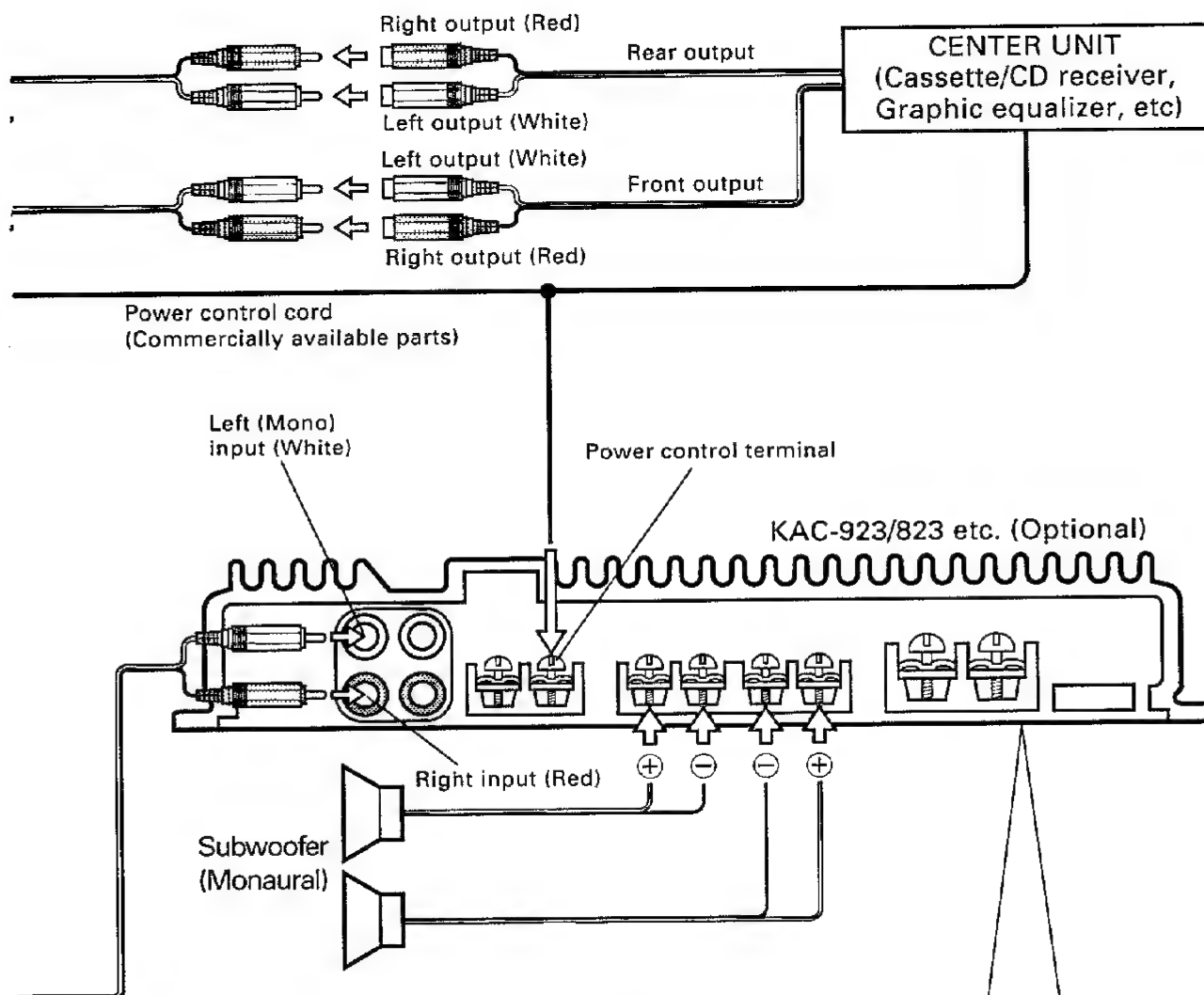
**System example 3.** Using the Line output jacks, a subwoofer is added to the system to output 90 Hz or less from them.



## Switch setting



< Refer to P. 9 for details on power source wiring. >

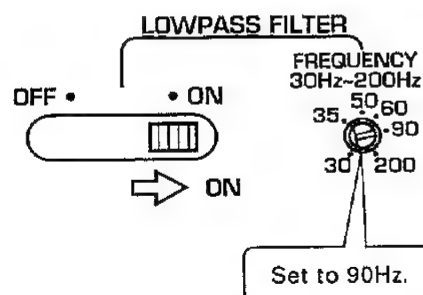


■ **Set the Low pass filter switch to ON and set the frequency control to the 90 Hz position.**

**NOTE**

- Use a power amplifier equipped with the low pass filter function (KAC-1023/923/823, etc.).
- For details on the system connection, power connection, etc., please refer to the instruction manual provided with your power amplifier.

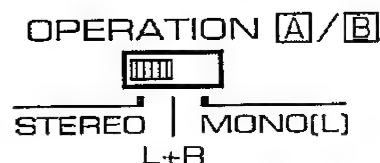
<Low pass filter adjustment>



# TRI-MODE

Only using coils and capacitors in the stereo 4-channel speaker system (refer below), a subwoofer can be added to the system.

## < Operation switch setting >



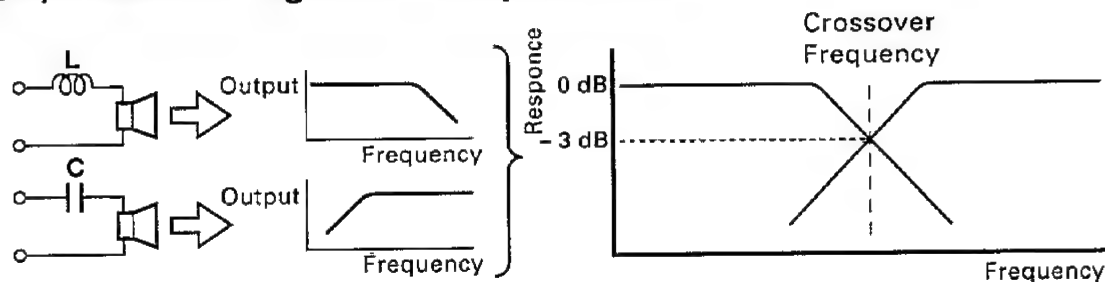
## < Speaker switch setting >



### ● Characteristics of coil and capacitor

- Coil (L): Passes low frequencies and blocks high frequencies. (Low pass)
- Capacitor (C): Passes high frequencies and blocks low frequencies. (High pass)

### ■ 6dB/octave for High and Low pass filter



### ■ Table of content for 6dB/octave

| Cross over frequency | Speaker impedance |               |          |               |
|----------------------|-------------------|---------------|----------|---------------|
|                      | 2 ohm             |               | 4 ohm    |               |
|                      | L (Coil)          | C (Capacitor) | L (Coil) | C (Capacitor) |
| 80 Hz                | 4.0 mH            | 1000 $\mu$ F  | 8.0 mH   | 500 $\mu$ F   |
| 100 Hz               | 3.2 mH            | 800 $\mu$ F   | 6.4 mH   | 400 $\mu$ F   |
| 150 Hz               | 2.1 mH            | 530 $\mu$ F   | 4.2 mH   | 270 $\mu$ F   |
| 200 Hz               | 1.6 mH            | 400 $\mu$ F   | 3.2 mH   | 200 $\mu$ F   |

- If the coils and capacitors are not available in the values listed, coils and capacitors with similar or close values can be used without affecting the performance in practical use.
- Coils and capacitors not listed in the above table can be determined using the following formulas.

$$C = \frac{159000}{f_c \times R} (\mu F)$$

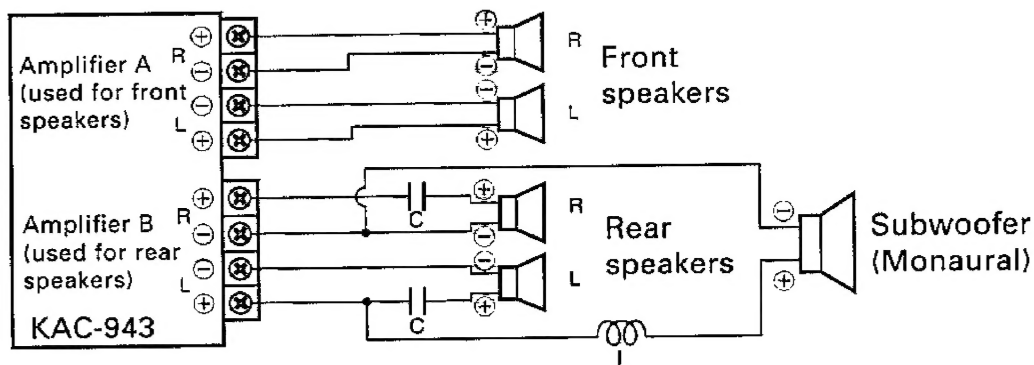
$$L = \frac{159 \times R}{f_c} (mH)$$

$f_c$  = Cut of Frequency (Hz)

$R$  = Speaker Impedance ( $\Omega$ )

## ■ SYSTEM EXAMPLES

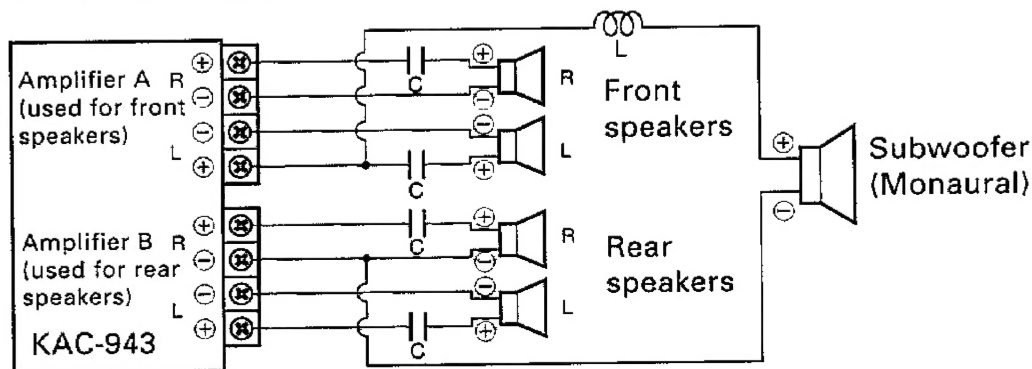
- When a subwoofer is added to the rear speaker system



### NOTE

Using the TRI-MODE PASSIVE CROSSOVER NETWORK "KPX-T120" (Optional) makes the system's wiring easier.

- When a subwoofer is added to the whole speaker system



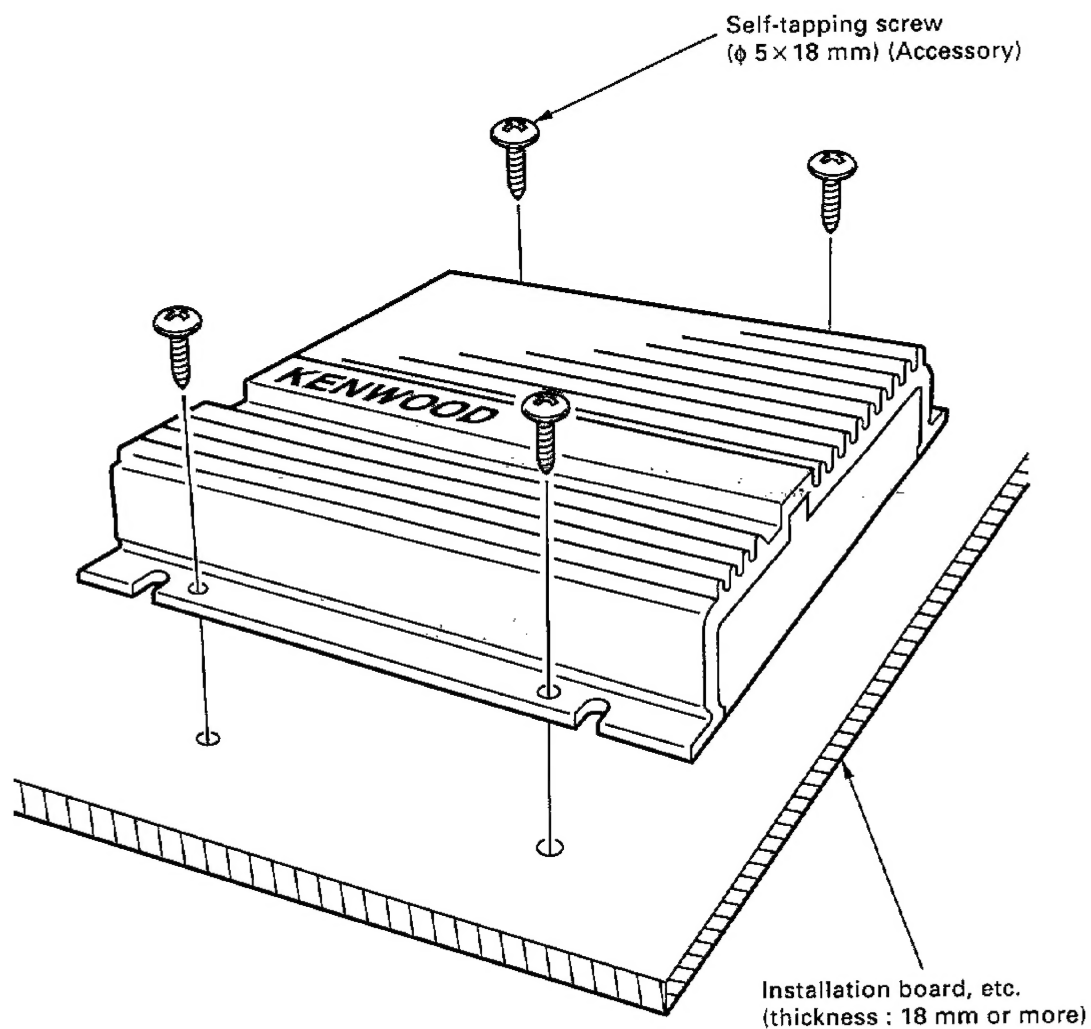
\* The subwoofer is not affected by the controls on the center unit.

### ⚠ CAUTION

Be sure that the combined impedance of your speaker system as seen from the KAC-943 is at least 2 ohms. An impedance of less than 2 ohms will damage the amplifier.

# INSTALLATION

## ■ Installation

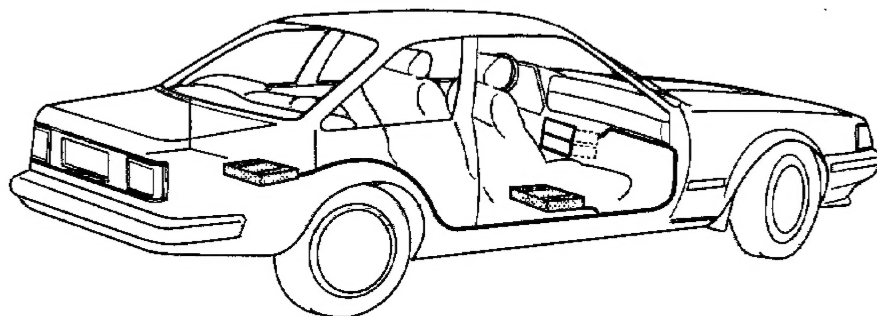


### **NOTE**

Do not install the unit under the carpet. Otherwise heat build-up occurs and the unit may be damaged.



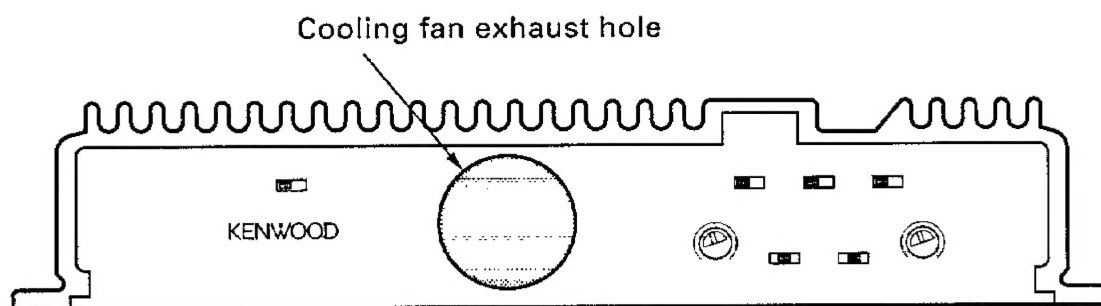
## ■ Installation location



- Since the power amplifier has no parts which require operation, it can be installed at a position away from the driver's seat without any hindrances. As generally accepted positions for its installation, places such as inside the trunk, etc. can be considered.

## ▲ CAUTION

- Install this unit in a location which allows heat to easily dissipate. Once installed, do not place any object on top of the unit.
- When the unit's internal temperature rises, the built-in cooling fans automatically operate to cool the unit. When selecting an installation position, be careful that the fan exhaust holes are not blocked so that hot air can be discharged from the unit. If the fan exhaust holes are blocked, cooling operation will be hindered causing the unit to malfunction.



- After installing the unit, check to make sure that electrical equipment such as the brake lamps, turn signal lamps and windshield wipers operate normally.
- Install the unit securely in a location that does not interfere with driving.

# TROUBLESHOOTING GUIDE

Often, what appears to be a malfunction is due to user error. Before calling for service, please consult the following table.

| Symptom                                                       | Cause                                                                                                                                                  | Remedy                                                                                             |
|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| <b>No sound.</b><br>(No sound from one side.)                 | A speaker cord has become unconnected.                                                                                                                 | Check the speaker cord connections.                                                                |
| <b>The level is too low</b><br>(or high).                     | The input sensitivity adjusting control is not set to the correct position.                                                                            | Adjust correctly referring to "CONTROLS".                                                          |
| <b>The sound quality is bad.</b><br>(The sound is distorted.) | 1. The speaker cord is connected to the terminals with improper $\oplus/\ominus$ polarity.<br>2. A speaker cord is pinched by a screw in the car body. | 1. Connect each speaker terminal to its respective speaker output.<br>2. Check the speaker wiring. |

## SPECIFICATIONS

Specifications subject to change without notice.

### Audio Section

Max Power Output (4  $\Omega$ )

|                |                          |
|----------------|--------------------------|
| 4 Channel Mode | 110 W $\times$ 4         |
| 3 Channel Mode | 110 W $\times$ 2 + 220 W |
| 2 Channel Mode | 220 W $\times$ 2         |

Rated Power Output at 12 V (4  $\Omega$ )

|                |                                                                           |
|----------------|---------------------------------------------------------------------------|
| 4 Channel Mode | 50 W $\times$ 4 (20 Hz~20 kHz, less than 0.05% THD)                       |
| 3 Channel Mode | 50 W $\times$ 2 (20 Hz~20 kHz, 0.05%)<br>+ 130 W $\times$ 1 (1 kHz, 0.3%) |
| 2 Channel Mode | 130 W $\times$ 2 (1 kHz, 0.3% THD)                                        |

Rated Power Output (2  $\Omega$ )

|                |                                   |
|----------------|-----------------------------------|
| 4 Channel Mode | 65 W $\times$ 4 (1 kHz, 0.3% THD) |
|----------------|-----------------------------------|

Frequency Response ..... 2 Hz~45 kHz (-3 dB)

Signal to Noise Ratio ..... 105 dB

Sensitivity (MAX.) ..... 0.15 V (rated output)

Sensitivity (MIN.) ..... 3.0 V (rated output)

Input Impedance ..... 10 k $\Omega$

Damping Factor (100 Hz) ..... More than 100

High pass filter frequency (12 dB/oct.) ..... 30 Hz~200 Hz (variable)

Low pass filter frequency (12 dB/oct.) ..... 30 Hz~200 Hz (variable)

### General

Operating Voltage ..... 12 V (11~16 V allowable)

Current Consumption (1 kHz, 10% THD) ..... 40 A

Dimensions (W  $\times$  H  $\times$  D) ..... 300  $\times$  56  $\times$  290 mm  
(11-13/16  $\times$  2-3/16  $\times$  11-7/16 in.)

Weight ..... 3.9 kg (19.9 lb)